SENSHU UNIVERSITY

The Senshu Social Well-being Review
2018, No. 5, 51-61

http://ir.acc.senshu-u.ac.jp

Does Trust Moderate the Effect of Relative Income on Happiness?

Hiroko Osaki[a]

Abstract

This study examined the moderating effect of generalized trust on the association between relative income and happiness based on microlevel data collected through a Japanese nationwide web survey. As a method for income comparison, we adopted subjective relative income, defined as the difference between one's income and the estimated average income of one's classmates. To examine the influence of income on happiness, we created *subjective richer* and *subjective poorer* variables that represented the asymmetric nature of richness and poorness. We estimated interaction effects between generalized trust and subjective relative income, or *richer*/*poorer,* with ordinary least squares regressions. First, generalized trust moderated the effect of subjective relative income on happiness. Thus, trust is expected to reduce gaps in happiness between individuals who perceive themselves to be richer or poorer than others. Second, the moderating effect of trust was significant for subjective relative income, but not absolute income. Third, the moderating effect of trust was not symmetric between the *richer*/*poorer* comparison. For the female subsample, trust moderated the negative effect of *subjective poorer*, but not the positive effect of *subjective richer*. For the male subsample, trust moderated the positive effect of *subjective richer*, but promoted the negative effect of *subjective poorer*.

Keywords

happiness, relative income, generalized trust, moderating effect

According to the relative income hypothesis, individual happiness or subjective well-being depends not only on absolute level of income, but also on the comparison between one's own income and the income of others (Oshio, Nozaki, and Kobayashi 2011). This theory suggests that people do not feel sufficiently happier without an increase in relative income, even if their absolute income increases. In fact, several recent studies have empirically confirmed the validity of the relative income hypothesis (Ferrer-i-Carbonell 2005; Oshio, Nozaki, and Kobayashi 2011; Oshio and Urakawa 2012). However, few studies have discussed solutions to address the gap in happiness between people who perceive themselves to be richer or poorer by way of comparisons with others.

Aside from income, one of the important factors of subjective well-being is social capital, consisting of trust, networks, and norms (Coleman 1990, Putnam 1993). It is the basis of social relationships and is understood to bring good outcomes for both individuals and societies. Also, in recent studies of subjective well-being, social capital was identified as a vital factor of happiness that has been overlooked (Leung

[a] University of Tokyo

Corresponding Author:
Hiroko Osaki, Institute of Social Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan.
Email: osakihiroko@gmail.com

et al. 2010). Among the components of social capital, many studies focus on trust, especially generalized trust, or trust in the generalized other. The positive effect of generalized trust on subjective well-being is empirically confirmed by Helliwell and Putnam (2004), Bjornskov (2006), Hommerich (2012) and Kanai (2016). In this paper, we attempt to examine the association between generalized trust and the relative income hypothesis. Before arguing it, we introduce several approaches to explain the effect of generalized trust on subjective well-being, based on previous theories.

One approach, based on Yamagishi's emancipation theory, which argues that generalized trust extends people's social relationships (Yamagishi and Yamagishi 1994), is that people with higher generalized trust are assumed to be happier because broader social relationships built by greater trust are expected to help achieve successful outcomes.

In this study, we focus on another approach in which generalized trust increases subjective well-being through psychological processes. Generalized trust has aspects of cooperative attitudes or stances, called "moral value" (Uslaner 2002) or "civic value/virtue" (Putnam 1993; Inglehart and Welzel 2005), that are present in the process of actively and autonomously trusting and cooperating with others. These active and civic characteristics of generalized trust are assumed to enhance positive evaluations of one's quality or ability in interpersonal relationships, and they increase subjective well-being.

However, how are these attributes of generalized trust associated with relative income hypothesis? This question prompted our research question below.

Research question. Does generalized trust influence the effect of relative income on subjective well-being? If so, how does it influence it?

We predicted that generalized trust would be associated with income comparisons with others as follows. In the theory arguing that generalized trust is a civic value, trust for people is assumed to be enhanced in horizontal social relationships, but not in vertical relationships (Putnam 1993); trust itself is also horizontal (Inglehart and Welzel 2005). Based on these arguments, we predicted that people with higher generalized trust would have a positive belief about horizontal societies, such that vertical income comparisons with others would be meaningless to them. However, people with lower generalized trust were assumed to feel inferior or superior by income comparison with others, because they lack the value of horizontal trust. In addition, we predicted that the nature of generalized trust would be effective for relative income, but not absolute income. Therefore, our hypothesis about the role of generalized trust in the association between relative income and subjective well-being is as follows.

Hypothesis. Generalized trust will moderate the effect of relative income on subjective well-being.

METHODS

Data

The empirical analyses of this study are based on Japanese microlevel data from the International Comparative Survey on Lifestyle and Values conducted by the Center for Social Well-being Studies at Senshu University. The Japanese data were collected using a nationwide web survey administered in 2015. The respondents were individuals aged between 20 and 69 years old that were selected from a survey agent's panel (Nikkei Research, Inc.) with similar proportions to the 2010 census distributions of gender, age, city size, and region. The number of effective responses was 11,814. However, the rate of college-educated people in this dataset was very high (64.9%, including graduates of junior college and technical college). Although this is a common problem of web surveys in Japan, we should take account of it when interpreting the results of the analyses.

Model

In this study, definitions for variables of relative income are based on Oshio et al. (2011), Oshio and Urakawa (2012), and Ferrer-i-Carbonell (2005). Following these studies, we defined relative income y_r as the difference between the log-transformed value of one's own income y and average income within the reference group y_g:

$$y_r = \ln(y) - \ln(y_g) \quad [1]$$

There are two main approaches for the definition of relative income in which reference groups differ. In one approach, relative income is defined as the difference between one's own income and the average income of a reference group that is objectively calculated by gender, age, educational level, region, etc. This study adopted another approach in which relative income was defined by the difference between one's own income and the average income of the respondents' classmates in his/her last school (Oshio and Urakawa 2012). In this latter approach, the average income of the reference group is determined by the question, "What do you think the current average annual income (pre-tax) is for those that graduated from the last school you attended?" Oshio and Urakawa (2012) argue that classmates in one's last school are likely to make similar lifestyle choice in aspects such as career decisions or income level, forming a reference group for the respondents. Thus, relative income derived through comparison of one's own income and the "estimated" income of classmates reflects the respondents' "subjective" prediction. We analyzed this subjective relative income instead of the objective values mentioned above because we were interested in psychological associations between trust and relative income in explaining subjective well-being. Subjective relative income, rather than objective income, seems to be straightforwardly related to generalized trust. Thus, in this study we defined y_g as the estimated average income of a respondent's classmates in his/her last school and y_r as one's subjective relative income.

Using the subjective relative income y_r, we estimated a regression model to explain perceived happiness:

$$Happiness = f(gt, y_r, y, gt^*y_r, gt^*y, X) \quad [2]$$

where gt was generalized trust, y_r was subjective relative income, y was one's own income, and X was a set of control variables. In this model, gt, y_r, and y were main effect terms and gt^*y_r and gt^*y were interaction effect terms. To confirm whether the interaction effect between income and generalized trust on happiness was valid for relative income y_r, but not for absolute income (one's own income y), we estimated effects of not only y_r and gt^*y_r, but also of y and gt^*y. While we defined y_r as the difference of log-transformed values in Eq. [1], we used original values (not log-transformed) for one's own income y in Eq. [2] to avoid multicollinearity, as implemented by Oshio and Urakawa (2012). This study used an ordinary least squares (OLS) regression model to predict 11-point items of happiness, which was regarded as a continuous variable. The main effects gt and y_r were both expected to be positive. Thus, if generalized trust moderated the effect of subjective relative income on happiness, the interaction effect gt^*y_r was expected to be negative.

Previous studies have pointed out that the relationship between relative income and happiness is asymmetric through income comparison (Ferrer-i-Carbonell 2005; Oshio et al. 2011). By rewriting Eq. [1] we decomposed relative income into two components, namely, *subjective richer* and *subjective poorer* as follows.

$$\begin{aligned} sub.\ richer &= \ln(y) - \ln(y_g) && \text{if } y > y_g \\ &= 0 && \text{otherwise} \\ sub.\ poorer &= \ln(y_g) - \ln(y) && \text{if } y < y_g \\ &= 0 && \text{otherwise} \end{aligned} \quad [3]$$

Note that *subjective poorer* is positive when one's own income y is lower than the average income of the reference group

y_g. These variables implicitly assume that richness and poorness may have asymmetric effects on other variables. For example, it might be that individuals feel unhappy if their income is below that of their reference group, while those with an income that is higher than that of their reference group are not sensitive to income comparisons (Oshio, Nozaki, and Kobayashi 2011). If that is the case, in the regression of happiness using the two variables in Eq. [3], the effect of *subjective poorer* is expected to be negative, but that of *subjective richer* is expected to be insignificant or of a smaller magnitude than *subjective poorer*, as Oshio and Urakawa confirm (2012). This asymmetric relationship between subjective relative income and happiness was assumed to affect the interaction effect between trust and subjective relative income. Thus, we also estimated another model by replacing y_r in Eq. [2] with *subjective richer* and *subjective poorer*:

Happiness = *f* (*gt*, *sub. richer*, *sub. poorer*, *y*, *gt*sub. richer*, *gt*sub. poorer*, *gt*y*, *X*) [4]

The main effect *gt* was expected to be positive, and *subjective richer* and *subjective poorer* were expected to be positive and negative, respectively. Thus, if generalized trust moderated the effect of *subjective richer* and *subjective poorer*, two interactions *gt*sub. richer* and *gt*sub. poorer* were expected to be negative and positive, respectively.

Operationalization

The variables were operationalized as follows.

Happiness. Happiness was measured on an 11-point scale. The respondents answered the question, "How happy are you currently?" with scores ranging from 0 ("very unhappy") to 10 ("very happy").

Generalized trust. We measured generalized trust with an average score of two items, trust in "most people" and "strangers." For each item, the respondents were asked to answer the question, "To what degree do you feel you can trust or not trust the following people?" on a five-point scale (1 = "Cannot trust at all" to 5 = "Can trust a lot").

Own income. Our data included respondents' individual and household incomes before tax. However, we only had data on household income for the estimated average income of reference groups (respondents' classmates from their last school). Thus, we used "household" annual income for both one's own income and relative income.

Subjective relative income. Subjective relative income was calculated according to the difference between two log-transformed values of one's own household income and the average household income of classmates in one's last school. The average household income of respondents' classmates was determined by the question, "What do you think the current average annual household income (pre-tax) is for those that graduated from the last school you attended?"

In the regression analyses, generalized trust, own income and subjective relative income were standardized (transformed to z-scores) to avoid high correlations between main effects and interaction effects between trust and income variables, which might cause multicollinearity.

In our regression models, some sociodemographic characteristics that are typically used in the literature on happiness (age, gender, marital status, having children, years of education, and occupational status) were controlled. All control variables were dummy coded, except for age and years of education.

We used 6,377 observations (male: 3,568, female: 2,809) with no missing data for any of the variables above. The descriptive statistics of each variable are shown in Table 1.

Table 1. Descriptive Statistics of Variables

	Entire sample (*n*=6,377)				Male (*n*=3,568)		Female (*n*=2,809)	
	Min.	Max.	Mean	SD	Mean	SD	Mean	SD
Happiness	0	10	6.42	2.21	6.19	2.25	6.72	2.13
Generalized trust	1	5	2.42	0.70	2.44	0.71	2.39	0.68
Z-score	-2.02	3.68	0.00	1.00	0.00	1.00	0.00	1.00
Subjective relative income	-4.09	6.96	0.04	0.80	0.02	0.82	0.06	0.78
Z-score	-5.17	8.65	0.00	1.00	0.00	1.00	0.00	1.00
Subjective richer	0	6.96	0.28	0.52	0.27	0.50	0.29	0.53
Z-score	-0.54	12.96	0.00	1.00	0.00	1.00	0.00	1.00
Subjective poorer	0	4.09	0.24	0.49	0.25	0.53	0.23	0.44
Z-score	-0.48	7.84	0.00	1.00	0.00	1.00	0.00	1.00
Household income (10,000 Yen)	25	2,500	681.81	428.14	704.29	442.98	653.25	406.81
Z-score	-1.53	4.25	0.00	1.00	0.00	1.00	0.00	1.00
Age	20	70	45.22	13.05	46.00	13.00	44.24	13.06
Years of education	9	21	14.82	2.21	15.17	2.29	14.37	2.03
Female (ref: Male)	0	1	0.44					
Married (ref: Not married)	0	1	0.66		0.64		0.69	
Having children (ref: Not having children)	0	1	0.57		0.56		0.58	
Occupational status								
Regular (ref)	0	1	0.49		0.65		0.27	
Non-regular	0	1	0.18		0.11		0.27	
Self-employed	0	1	0.09		0.11		0.07	
Not working	0	1	0.24		0.13		0.38	

Note: Min = minimum. Max = maximum. SD = standard deviation. ref = reference category.

RESULTS AND DISCUSSION

Descriptive Analysis

Before discussing regression results, we first present the relationships between generalized trust, subjective relative income, and happiness through descriptive analyses of the entire sample.

Figure 1 displays the interaction between generalized trust and subjective relative income. First, regarding main effects, respondents with higher subjective relative income and higher trust were happier. Second, the difference in happiness between respondents with lower subjective relative income and higher subjective relative income became smaller with a rise in the trust level. This suggests a negative interaction between trust and subjective relative income.

On the other hand, Figures 2a and 2b display the interaction between generalized trust and *subjective richer* and *subjective poorer*, respectively. First, regarding main effects, respondents who perceived themselves as richer (poorer) than their classmates were happier (unhappier). Second, we found that differences in happiness between respondents who felt "not richer (poorer)" and "very much richer (poorer)" became smaller with the rise in trust level. This suggests negative interaction effects between trust and *subjective richer* and *subjective poorer*.

Regression Analysis

Based on the descriptive analysis, generalized trust seems to moderate the effect of subjective relative income on happiness regardless of whether the income comparison is perceived as *subjective richer* or *subjective poorer*. We examined whether interaction effects between generalized trust and subjective relative income, *subjective richer*/*poorer* were present when other variables are controlled for in the regression analyses.

First of all, Table 2 shows the results of regression models testing the effectiveness of the interaction between generalized trust

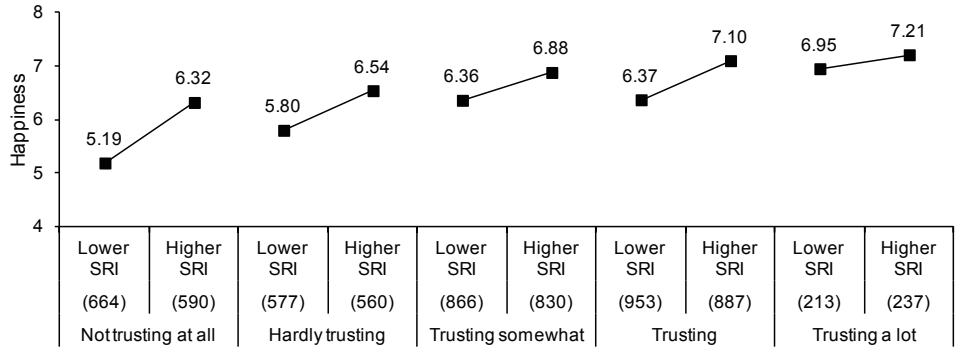

Figure 1. Interaction Between Generalized Trust and Subjective Relative Income (SRI)

Note: Values within parentheses represent sample size. "Not trusting at all," "Hardly trusting," "Trusting somewhat," "Trusting," and "Trusting a lot" represent 1 to 1.5 (19.7%), 2 (17.8%), 2.5 (26.6%), 3 (28.9%), and 3.5 to 5 (7.1%) generalized trust values, respectively. "Lower SRI" and "Higher SRI" indicate lower half (-4.094 to 0.049; 51.3%) and upper half (0.054 to 6.957; 48.7%) subjective relative income values, respectively.

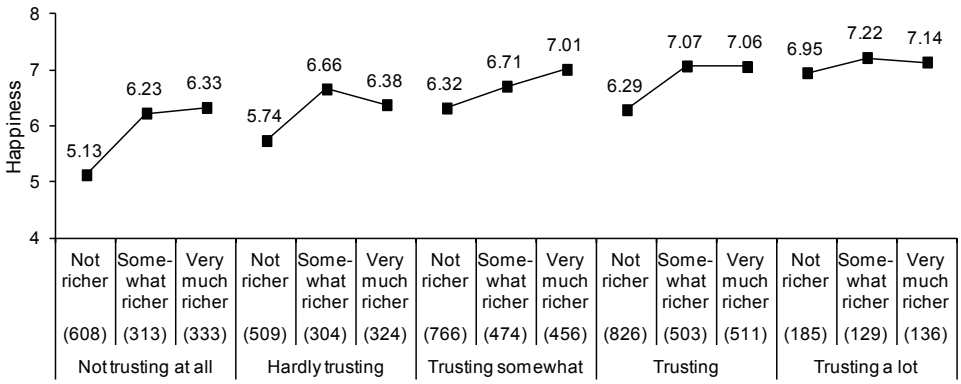

Figure 2a. Interaction Between Generalized Trust and *Subjective Richer*

Note: Values within parentheses represent sample size. "Not trusting at all," "Hardly trusting," "Trusting somewhat," "Trusting," and "Trusting a lot" represent 1 to 1.5 (19.7%), 2 (17.8%), 2.5 (26.6%), 3 (28.9%), and 3.5 to 5 (7.1%) generalized trust values, respectively. "Not richer," "Somewhat richer," and "Very much richer" represent 0 (45.4%), 0.010 to 0.329 (27.0%), 0.331 to 6.957 (27.6%) *subjective richer* values, respectively.

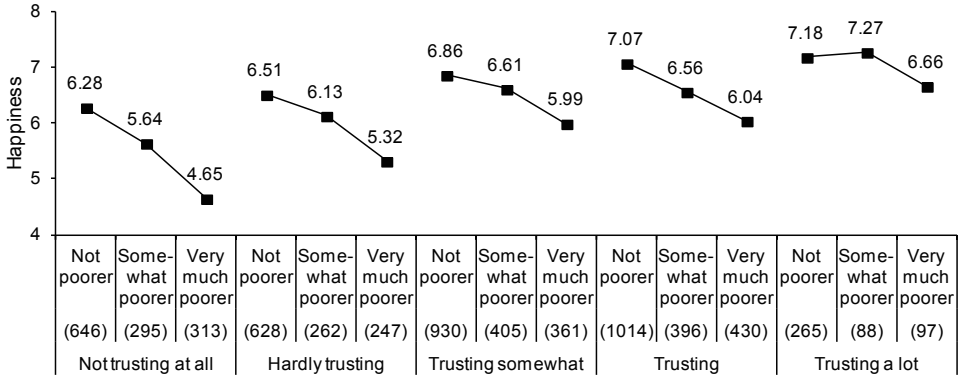

Figure 2b. Interaction Between Generalized Trust and *Subjective Poorer*

Note: Values within parentheses represent sample size. "Not trusting at all," "Hardly trusting," "Trusting somewhat," "Trusting," and "Trusting a lot" represent 1 to 1.5 (19.7%), 2 (17.8%), 2.5 (26.6%), 3 (28.9%), and 3.5 to 5 (7.1%) generalized trust values, respectively. "Not poorer," "Somewhat poorer," and "Very much poorer," represent 0 (54.6%), 0.010 to 0.307 (22.7%), 0.311 to 4.094 (22.7%) *subjective poorer* values, respectively.

and subjective relative income, defined in Eq. [2]. The results of model 1 show that all main effects of trust and income are significantly positive. As confirmed in previous studies, the positive effect of subjective relative income is significant when controlling the effect of household income. The effects of control variables are as follows. Younger age, female gender, married status, having children, and years of education all significantly increased respondents' happiness. Further, respondents with non-regular employment were significantly unhappier, compared to respondents with regular employment. The results in model 2 show that the interaction effect between generalized trust and subjective relative income is negative and significant. These findings support our hypothesis. In contrast, the interaction effect between trust and household income is non-significant.[1] This suggests that trust moderates differences in happiness through subjective relative income, and that such a moderating effect is valid only for subjective relative income, but not for household income.

Then, is this interaction between generalized trust and subjective relative income affected by whether income comparison is taken as *subjective richer* or *subjective poorer*? Table 3 shows the results of the regression models replacing subjective relative income in models 1, and 2 by *subjective richer* and *subjective poorer*, as defined in Eq. [4]. The results of model 3 show that the effect of *subjective poorer* is significantly negative, while the effect of *subjective richer* is non-significant. Are people sensitive to being poorer rather than being richer compared to their classmates? We should be careful how we interpret this question. The results of model 4 show that the interaction between trust and *subjective richer* is significantly negative. This suggests that people with lower trust are likely to feel happier by perceiving themselves as richer compared to their classmates, whereas people who are more trusting are unlikely to feel happier by the comparison, as shown in Figure 2a. In this way we can find the effect of *subjective richer* on happiness only when we consider trust level. On the other hand, the results of model 4 also show that the interaction effect between trust and *subjective poor* is non-significant. This indicates that feeling poorer compared to one's classmates decreases happiness regardless of trust level. From these results, we find that the moderating effect of generalized trust is not

Table 2. Regression Analysis Using Subjective Relative Income (Entire Sample)

	Model 1			Model 2		
	B		SE	B		SE
Generalized trust (GT)	0.379	***	0.026	0.376	***	0.026
Subjective relative income (SRI)	0.114	***	0.031	0.122	***	0.031
Household income (HI)	0.222	***	0.032	0.218	***	0.032
GT x SRI				-0.061	*	0.026
GT x HI				-0.006		0.029
Age	-0.009	***	0.002	-0.009	***	0.002
Female	0.554	***	0.058	0.548	***	0.058
Married	1.101	***	0.071	1.097	***	0.071
Children	0.170	*	0.069	0.173	*	0.069
Years of education	0.032	**	0.012	0.032	**	0.012
Occupational status						
Non-regular	-0.224	**	0.078	-0.223	**	0.078
Self-employed	0.031		0.095	0.033		0.095
Not working	0.064		0.073	0.067		0.073
Intercept	5.294	***	0.221	5.299	***	0.221
Adjusted R^2	0.149			0.150		
n	6,377			6,377		

Note: The dependent variable was happiness. GT, SRI, and HI were standardized. B = unstandardized regression coefficient. SE = standard error. ***$p < .001$, ** $p < .01$, *$p < .05$.

Table 3. Regression Analysis Using *Subjective Richer* and *Subjective Poorer* (Entire Sample)

	Model 3			Model 4		
	B		SE	B		SE
Generalized trust (GT)	0.379	***	0.026	0.384	***	0.026
Subjective richer (SR)	0.000		0.029	0.022		0.029
Subjective poorer (SP)	-0.153	***	0.030	-0.151	***	0.030
Household income (HI)	0.224	***	0.032	0.212	***	0.032
GT x SR				-0.095	***	0.024
GT x SP				-0.031		0.024
GT x HI				-0.019		0.029
Age	-0.009	***	0.002	-0.008	***	0.002
Female	0.541	***	0.058	0.538	***	0.058
Married	1.056	***	0.072	1.052	***	0.072
Children	0.172	*	0.069	0.183	**	0.069
Years of education	0.030	*	0.012	0.030	*	0.012
Occupational status						
Non-regular	-0.197	*	0.078	-0.201	**	0.078
Self-employed	0.064		0.095	0.056		0.095
Not working	0.101		0.073	0.089		0.073
Intercept	5.330	***	0.221	5.325	***	0.221
Adjusted R^2	0.150			0.153		
n	6,377			6,377		

Note: The dependent variable was happiness. GT, SR, SP, and HI were standardized. B = unstandardized regression coefficient. SE = standard error. *** $p < .001$, ** $p < .01$, *$p < .05$.

symmetric through income comparison.

Finally, we examined differences by gender. Tables 4 and 5 show the results of regression models for male and female subsamples, testing the interaction effects using subjective relative income (model 5) and *subjective richer* and *subjective poorer* (model 6), respectively.

From the results of model 5 we can see that the negative interaction effect between generalized trust and subjective relative income is significant only for the female subsample, while the main effects of trust and subjective relative income are significantly positive for both male and female subsamples.

On the other hand, the results of model 6 show that the main effect of *subjective poorer* is significantly negative, but that of *subjective richer* is non-significant, for both male and female subsamples. However, the interaction effects in model 6 differed distinctively by gender. For the male subsample, the interaction between generalized trust and *subjective richer* are significantly negative, suggesting that the moderating effect of trust is similar to that observed with the entire sample. However, the interaction between generalized trust and *subjective poorer* is significantly negative. Unexpectedly, this suggests that trust does not moderate, but promotes the negative effect of *subjective poorer*.[2] The negative effect promoted by trust means that males who perceived themselves as poorer compared to their classmates still felt unhappier when they had higher generalized trust. This is inconsistent with our prediction. How can we explain this result? A likely explanation is that males might feel miserable about themselves or the fact that they have low incomes, which are "below average" compared to their classmates, even though they also perceive people and societies to be trustworthy and cooperative. If this explanation is valid, we might need to amend our hypothesis to, "Generalized trust moderates the positive effect of *subjective richer* on happiness, whereas it promotes a negative effect of *subjective poorer* on happiness." On this point, we need to accumulate studies analyzing similar data.

In contrast, the results of the female subsample are straightforward. The interaction

between generalized trust and *subjective poorer* is significantly positive, suggesting that trust moderated the negative effect of *subjective poorer*. This is consistent with our hypothesis. In other words, females feel unhappier when perceiving themselves as poorer compared to their classmates, and such a decline in happiness is moderated by trusting others. In contrast, the interaction between generalized trust and *subjective*

Table 4. Regression Analysis Using Subjective Relative Income (Male and Female Subsamples)

	Model 5					
	Male			Female		
	B		SE	B		SE
Generalized trust (GT)	0.364	***	0.035	0.388	***	0.039
Subjective relative income (SRI)	0.119	**	0.043	0.120	**	0.046
Household income (HI)	0.236	***	0.044	0.223	***	0.047
GT x SRI	-0.024		0.033	-0.119	**	0.041
GT x HI	-0.025		0.039	0.011		0.043
Age	-0.012	***	0.003	-0.010	**	0.003
Married	1.419	***	0.103	0.765	***	0.102
Children	0.191		0.100	0.094		0.096
Years of education	0.042	**	0.016	0.008		0.020
Occupational status						
Non-regular	-0.095		0.119	-0.201		0.110
Self-employed	0.122		0.117	0.059		0.166
Not working	0.328	**	0.113	0.070		0.106
Intercept	5.030	***	0.279	6.481	***	0.348
Adjusted R^2	0.172			0.102		
n	3,568			2,809		

Note: The dependent variable was happiness. GT, SRI, and HI were standardized. B=unstandardized regression coefficient. SE=standard error. ***$p < .001$, **$p < .01$, *$p < .05$.

Table 5. Regression Analysis Using *Subjective Richer* and *Subjective Poorer* (Male and Female Subsamples)

	Model 6					
	Male			Female		
	B		SE	B		SE
Generalized trust (GT)	0.383	***	0.035	0.384	***	0.039
Subjective richer (SR)	0.034		0.042	0.000		0.043
Subjective poorer (SP)	-0.163	***	0.041	-0.173	***	0.045
Household income (HI)	0.221	***	0.045	0.217	***	0.047
GT x SR	-0.109	***	0.031	-0.063		0.042
GT x SP	-0.112	***	0.032	0.094	*	0.037
GT x HI	-0.047		0.039	0.011		0.043
Age	-0.012	***	0.003	-0.009	**	0.003
Married	1.390	***	0.103	0.708	***	0.104
Children	0.206	*	0.099	0.100		0.096
Years of education	0.041	**	0.016	0.005		0.020
Occupational status						
Non-regular	-0.052		0.119	-0.188		0.110
Self-employed	0.149		0.118	0.087		0.166
Not working	0.353	**	0.116	0.085		0.106
Intercept	5.046	***	0.278	6.528	***	0.348
Adjusted R^2	0.179			0.103		
n	3,568			2,809		

Note: The dependent variable was happiness. GT, SR, SP, and HI were standardized. B=unstandardized regression coefficient. SE=standard error. ***$p < .001$, ** $p < .01$, *$p < .05$.

richer is non-significant, suggesting that trust did not moderate the positive effect of *subjective richer*. As the main effect of *subjective richer* is non-significant too, females are assumed to be insensitive to being richer than their classmates.

CONCLUSIONS

This study examined the moderating effect of generalized trust on the association between relative income and happiness based on microlevel data collected from a Japanese nationwide web survey. As the method for income comparison, we adopted subjective relative income, which is the difference between one's own income and the estimated average income of one's classmates. We also used variables of *subjective richer* and *subjective poorer* to examine the influence of income comparison. We estimated the interaction effects between generalized trust and subjective relative income or *richer*/*poorer* with OLS regressions. Lastly, we compared results by gender. Our findings are summarized below.

First, the main finding in this paper is that generalized trust not only enhances happiness, but also reduces the gap in happiness between individuals perceiving themselves to be richer and poorer than others. Our regression analysis revealed a moderating effect of generalized trust on the association between subjective relative income and happiness.

Second, the moderating effect of trust is significant only for subjective relative income, but not absolute income. This provides more evidence for the validity of our assumption about the role of generalized trust on income comparison.

Third, the moderating effect of generalized trust is not symmetric between richer and poorer comparisons. On this point our regression analysis confirmed different findings by gender. For the female subsample, generalized trust moderated the negative effect of *subjective poorer*, whereas it did not moderate the positive effect of *subjective richer*. On the other hand, for the male subsample, generalized trust moderated the positive effect of *subjective richer*; however, it did not moderate but promoted the negative effect of *subjective poorer*. This asymmetry suggests the possibility that trust might have different roles for richer and poorer people by moderating and promoting gaps in happiness through income comparison. To examine this, we need further studies analyzing several different samples (e.g., employed/unemployed, married/unmarried, younger/older, etc.). It might also be helpful to complete similar analyses to those in this study but using individual income data instead of household income data to understand asymmetry in the role of trust.

The policy implications of this study are as follows. Although we tend to compare our own income with that of others, in today's society with its large income disparities, the gap in happiness between people feeling richer and poorer can be narrowed by forming a high-trust society. Conversely, a society with both large income disparity and distrust should be absolutely avoided because the gap in happiness through comparison with others is expected to widen in this context. However, how a high-trust society can be realized is beyond the scope of this paper. Additional investigation on this topic is needed.

We recognize that this study has several limitations. First, we defined the reference group as one's classmates in his/her last school. However, the reference group might depend on the person. We need further studies to examine the relationship between trust and subjective relative income based on who the respondents identified as the reference. Second, this study was based on a sample with many highly-educated people. We should examine the validity of our hypothesis by using a more representative sample. Finally, while this study assumed a moderating effect of generalized trust, we cannot exclude the possibility that relative income moderates the association between trust and happiness from our cross-section data and models. We need to adopt methods by which to identify the causality of interactions. These issues must be addressed in our future research.

Acknowledgments

This work was supported by the MEXT-Supported Program for the Strategic Research Foundation at Private Universities of Japan, 2014-2018 (S1491003). "International Comparative Surveys on Lifestyle and Values" were designed and conducted by the Center for Social Well-being Studies, Institute for the Development of Social Intelligence, Senshu University, Japan, in collaboration with Social Well-being Research Consortium in Asia.

Notes

1. We confirmed that the result remains the same if the interaction between trust and subjective relative income is omitted from model 2.
2. We examined the possibility of multicollinearity in the two interactions between trust and *subjective richer* and *subjective poorer* because both terms were derived from one variable (subjective relative income) and might be highly correlated. We checked the correlation and VIF of the two interaction terms in a male subsample. In model 6, the correlation was -0.213 and VIF was 1.3–1.4. These values are not high; therefore, we need not consider the possibility of multicollinearity. We also tested the two interaction effects separately in different models, and confirmed that the two interaction effects remained the same as those of model 6.

References

Bjornskov, Christian. 2006. "The Multiple Facets of Social Capital." *European Journal of Political Economy* 22(1):22–40.

Coleman, James S. 1990. *Foundations of Social Theory*. Cambridge, MA: Belknap Press of Harvard University Press.

Ferrer-i-Carbonell, Ada. 2005. "Income and Well-being: An Empirical Analysis of the Comparison Income Effect." *Journal of Public Economics* 89(5–6):997–1019.

Helliwell, John F., and Robert D. Putnam. 2004. "The Social Context of Well-being." *Philosophical Transactions: Royal Society of London Series B Biological Sciences* 359(1449):1435–46.

Hommerich, Carola. 2012. "Trust and Subjective Well-being after the Great East Japan Earthquake, Tsunami and Nuclear Meltdown: Preliminary Results." *International Journal of Japanese Sociology* 21(1):46–64.

Inglehart, Ronald, and Christian Welzel. 2005. *Modernization, Cultural Change, and Democracy: The Human Development Sequence*. Cambridge: Cambridge University Press.

Kanai, Masayuki. 2016. "Contextual Effects of Bridging Social Capital on Subjective Well-being." *The Senshu Social Well-being Review* 2:41–50.

Leung, Ambrose, Cheryl Kier, Tak Fung, Linda Fung, and Robert Sproule. 2010. "Searching for Happiness: The Importance of Social Capital." *Journal of Happiness Studies* 12(3):443–62.

Oshio, Takashi, Kayo Nozaki, and Miki Kobayashi. 2011. "Relative Income and Happiness in Asia: Evidence from Nationwide Surveys in China, Japan, and Korea." *Social Indicators Research* 104(3):351–67.

Oshio, Takashi and Kunio Urakawa. 2012. "Relative Income and Subjective Well-being in Japan: Perceived Happiness, Self-Rated Health, and Trust." *The Economic Review* 63(1):42–55.

Putnam, Robert D. 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton, NJ: Princeton University Press.

Uslaner, Eric M. 2002. *The Moral Foundations of Trust*. Cambridge, UK: Cambridge University Press.

Yamagishi, Toshio and Midori Yamagishi. 1994. "Trust and Commitment in the United States and Japan." *Motivation and Emotion* 18(2):129–66.

Hiroko Osaki is Project Research Associate at the Institute of Social Science, University of Tokyo. Her research focuses on social and institutional trust, modernization and values, inequality and education, and subjective well-being.